

CLAIMS

What is claimed is:

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1. A method for automatically processing a representation  
of a multimedia presentation having multiple  
5 information streams contained therein, the method  
comprising the steps of:  
(a) matching observed event cues detected within at  
least one information stream of the multimedia  
presentation with a model of expected event cues  
10 for a class of presentations to which the  
specific multimedia presentation belongs; and  
(b) selecting presentation segments of the multimedia  
presentation based upon the results of matching  
observed event cues with the model of expected  
15 event cues.
2. A method as in Claim 1 wherein the step of selecting  
presentation segments is implemented using a finite  
state machine having the expected event cues as state  
transitions.
- 20 3. A method as in Claim 1 wherein the expected event cues  
comprise a plurality of time difference based cues.

4. A method as in Claim 1 wherein the expected event cues comprise a plurality of intrastream cues taken from a given information stream.
5. A method as in Claim 1 wherein the expected event cues  
5 comprise interstream cues taken from more than one information stream, and the step of selecting presentation segments comprises correlating the interstream event cues.
6. A method as in Claim 1 wherein the expected event cues  
10 are taken from a text information stream.
7. A method as in Claim 6 wherein the expected event cues are closed captioned word cues.
8. A method as in Claim 6 wherein the expected event cues are closed captioned punctuation cues.
- 15 9. A method as in Claim 6 wherein the expected event cues are token phrases for the class of multimedia presentation.
10. A method as in Claim 9 wherein the token phrases comprise text strings.

11. A method as in Claim 9 wherein the token phrases comprise closed captioned punctuation cues.
12. A method as in Claim 11 wherein the close captioned punctuation cues are selected from the group  
5 consisting of ">>", ">>>", and ":".
13. A method as in Claim 9 wherein the token phrases comprise a named entity and a text string.
14. A method as in Claim 13 wherein the token phrases include "I'm" followed by a <person> named entity.
- 10 15. A method as in Claim 9 wherein the token phrases comprise a named entity and a closed captioned punctuation cue.
16. A method as in Claim 15 wherein the token phrases include a <person> named entity followed by a ":".
- 15 17. A method as in Claim 9 wherein the token phrases comprise introductory news broadcast terms.
18. A method as in Claim 17 wherein at least one token phrase is selected from the group consisting of "I'm", "hello", "welcome", "hello from", "welcome to",  
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"thanks for watching", "thanks for joining us", and "here on".

19. A method as in Claim 9 wherein the token phrases comprise anchor to reporter hand-off phrases.
- 5 20. A method as in Claim 19 wherein at least one token phrase comprises a reporter named entity.
21. A method as in Claim 19 wherein at least one token phrase is selected from the group consisting of a station identification with a reporter named entity, a  
10 reporter named entity with the phrase "joins us", and a reporter named entity with the phrase "reports".
22. A method as in Claim 9 wherein the token phrases comprise reporter to anchor hand-off phrases.
23. A method as in Claim 22 wherein at least one token  
15 phrase is selected from the group consisting of a station identification with a reporter named entity, a reporter named entity with a located named entity, "back to you", and "thank you".
24. A method as in Claim 9 wherein the token phrases  
20 comprise leaders to highlights of upcoming news stories.

25. A method as in Claim 24 wherein at least one token phrase is selected from the group consisting of "coming up", "next on", "ahead on", "when" together with a station identification and "returns", and "also ahead".
26. A method as in Claim 9 wherein the token phrases comprise sign off phrases.
27. A method as in Claim 26 wherein at least one token phrase is selected from the group consisting of "that wraps up", "that is all", "that's all", "that's" together with a news program identification, "thanks for watching", and "thanks for joining us".
28. A method as in Claim 6 wherein the expected event cues are named entities.
29. A method as in Claim 28 wherein the named entities are selected from the group consisting of persons, locations, organizations, times, dates and monetary values.
30. A method as in Claim 1 wherein the model of expected event cues is developed from observed event cues occurring in a class of media presentations.

31. A method as in Claim 28 wherein the model of expected event cues is developed by statistical analysis of observed event cues.
- 5 32. A method as in Claim 1 wherein the expected event cues are taken from an image information stream.
33. A method as in Claim 32 wherein the expected event cues are selected from the group consisting of black frame, logo frame, single anchor frame, double anchor frame, and reporter frame.
- 10 34. A method as in Claim 1 wherein the expected event cues are taken from an audio information stream.
35. A method as in Claim 34 wherein the expected event cues are selected from the group consisting of silence detection, speaker change detection, and jingle detection.
- 15 36. A method as in Claim 1 wherein the expected event cues are indications of news stories.
37. A method as in Claim 34 wherein the expected event cues are selected from the group consisting of before start of broadcast, start of broadcast, highlight
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segment, advertising, story start, story end, before end of broadcast, and end of broadcast.

38. A method for automatically processing a representation of a multimedia presentation having multiple information streams contained therein, the method comprising the steps of:

- (a) selecting at least one contiguous portion of the multimedia presentation as a story segment;
- (b) extracting text information from a text information stream corresponding to the story segment as text data;
- (c) extracting story summary data from the text data;
- (d) extracting named entities from the text data; and
- (e) linking together a stored representation of the text data, summary data, and named entity data for the story segment.

39. A method as in Claim 38 wherein the method additionally comprising the steps of:

- (f) storing the representations of the text data, summary data, and named entity data for story segments as one or more files on a file server computer connected to a computer network; and
- (g) allowing access to the stored representations of news story segments available to a browser

program running on at least one client computer connected to the computer network.

40. A method for automatically processing a representation of a multimedia presentation having multiple information streams contained therein, the method comprising the steps of:
- (a) selecting at least one contiguous portion of the multimedia presentation as a story segment;
  - (b) extracting text information from a text information stream corresponding to the story segment as text data;
  - (c) extracting named entities from the text data; and
  - (d) extracting story summary data using the named entities as a basis.
41. A method as in Claim 40 wherein the step of extracting story summary data additionally comprises the step of:
- (a) determining a frequency of occurrence for the named entities per sentence in a story segment; and
  - (b) selecting a sentence with a greatest named entity frequency of occurrence as a topic sentence.
42. A method as in Claim 41 wherein step (b) of selecting a sentence additionally comprises the step of:



5 (i) if more than one sentence has a greatest  
named entity frequency of occurrence,  
selecting the sentence closest to the  
beginning of the story as the topic  
sentence.

43. A method for automatically processing a representation  
of a multimedia presentation having multiple  
information streams contained therein, the method  
comprising the steps of:

10 (a) selecting at least one contiguous portion of the  
multimedia presentation as a story segment, by  
matching a model of expected event cues with  
observed event cues in at least one information  
stream; and

15 (b) presenting a summary display of the story segment  
including one or more named entities extracted  
from a text stream together with a key frame  
extracted from an imagery stream.

44. A method for automatically processing a representation  
20 of a multimedia presentation having multiple  
information streams contained therein, the method  
comprising the steps of:

(a) selecting at least one contiguous portion of the  
multimedia presentation as a story segment; and

(b) selecting a key frame from an imagery stream representative of the segment based upon the type of segment.

45. A method as in Claim 44 wherein the story segment  
5 contains a reporter segment and the key frame is selected from the middle of the reporter segment.

46. A method as in Claim 44 wherein the story segment contains an anchor booth segment and the key frame is selected from the middle of the anchor booth segment.

10 47. A method for presenting a summary representation of a multimedia presentation having multiple information streams contained therein, the method comprising the steps of:

15 (a) automatically extracting contiguous portions of the multimedia presentation as story segments;  
and

(b) presenting a summary display of having multiple summary presentation elements representative of the extracted story segments.

20 48. A method as in Claim 47 wherein the summary presentation elements from a given story segment are displayed together.

49. A method as in Claim 48 wherein the summary presentation elements comprise named entities.
50. A method as in Claim 48 wherein the summary presentation elements comprise summary sentences.
- 5 51. A method as in Claim 48 wherein the summary presentation elements comprise a hyperlink to a source media element of the segment.
52. A method as in Claim 48 wherein step (b) of presenting a summary display additionally comprises the step of:
- 10       presenting extracted named entities in a hypertext link form such that hyperlinks lead to presentation of additional elements of the story segment.
53. A method as in Claim 43 wherein step (b) of presenting a summary display additionally comprises the step of:
- 15       in response to a search query for a selected named entity, presenting a thumbnail view comprising key frames from multiple story segments containing the selected named entity.
- 20 54. A method as in Claim 43 wherein step (b) of presenting a summary display additionally comprises the step of:

in response to a search query for a story segments of a selected type, presenting a thumbnail view comprising key frames from multiple story segments of the selected type.

- 5 55. A method for automatically processing a representation  
of a multimedia presentation having multiple  
information streams contained therein, the method  
comprising the steps of:
- 10 (a) selecting at least one contiguous portion of the  
multimedia presentation as a story segment;
- (b) extracting information from at least one  
information stream corresponding to the story  
segment as source data;
- 15 (c) extracting a summary representation of the story  
segment from the source data; and
- (d) presenting a plurality of related story segments  
using a layered hierarchical presentation of the  
summary representations at a relatively high  
hierarchical level and the source data at a  
20 relatively low hierarchical level, together with  
hyperlinks permitting navigation among related  
story segments to a desired hierarchical level of  
representation.
56. A method as in Claim 55 wherein the information stream  
25 is a text stream, the source data is text relating to

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a story segment, and the summary representation includes named entities.

57. A method as in Claim 55 wherein the information stream is an image stream, the source data is image data for the complete story segment, and the summary representation is a key frame.

58. A method for automatically processing a representation of a multimedia presentation having multiple information streams contained therein, the method comprising the steps of:

- (a) selecting at least one contiguous portion of the multimedia presentation as a story segment;
- (b) extracting named entities from a text information stream corresponding to the story segment; and
- (c) using extracted named entities as search criteria to select from among a plurality of story segments.

59. A method as in Claim 58 additionally comprising the step of:

- (d) in response to a search query, presenting a list of named entities and their corresponding number of occurrences in story segments over a selected time period.

60. A method as in Claim 58 additionally comprising the step of:

- 5 (d) in response to a search query, presenting a graph of named entities and their corresponding frequency of occurrences in story segments over a selected time period.

61. A method as in Claim 60 additionally comprising the step of:

- 10 (e) in response to selection of a point on the graph of named entities, presenting the user with an overview story segments containing the selected named entity.

62. A method as in Claim 58 additionally comprising the step of:

- 15 (d) in response to a search query for a story segments of a selected type, presenting a thumbnail view comprising key frames from multiple story segments of the selected type.